V. REMARKS

Claims 1-20 are pending in this application. Applicants do not acquiesce in the correctness of the rejections and reserve the right to present specific arguments regarding any rejected claims not specifically addressed. Further, Applicants reserve the right to pursue the full scope of the subject matter of the original claims in a subsequent patent application that claims priority to the instant application. Reconsideration in view of the following remarks is respectfully requested.

In the Office Action, claims 1-2, 5-9, 12-16, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sayah (US patent no 5,761,664), hereafter "Sayah" in view of Goldstein et al. (US patent no 4,698,752), hereafter "Goldstein." Claims 3-4, 10-11 and 17-18 have been indicated as containing allowable subject matter. Applicants gratefully appreciate the indication of allowable subject matter.

Applicants respectfully submit that the combinations of the cited art furnished by the Office do not teach or suggest each and every feature of the claimed invention. First, with respect to independent claim 1, Sayah fails to teach or suggest a binding system as alleged by the Office. In contrast, Sayah discloses a computer model for facilitating computer-assisted design using flexible data structures. (Abstract.) The Sayah computer model is especially adapted for building a data structure based upon an underlying physical design, such as an integrated circuit, where the components of the physical design each have an area. (Col. 5, lines 8-12.) After the data structure has been completed, Sayah then creates a hierarchical graph with each node in the hierarchical graph pointing to data in the data structure. (Col. 10, lines 41-51.) The hierarchical graph created by Sayah simply rearranges the data in the existing data structure and does not

include logic for more efficiently walking the data. In contrast, the current invention includes "...a binding system for binding a graph observer with a data graph, for binding node patterns to node observers to generate at least one node pattern/node observer pair, and for binding the data graph observer to at least one node pattern/node observer pairing, and wherein each node pattern includes a computed set of target sub-node patterns." (Claim 1.) The binding system as provided in the current invention does not simply develop the existing data into trees and subtrees as does Sayah. The current invention instead binds graph observers with node pattern/node observer pairings to the data in an existing graph or tree. The logic, patterns, data and other information in these graph observers with node pattern/node observer pairings allow the present invention to more efficiently walk a pre-existing data graph. Additionally, the sub-node patterns as included in the present invention further enhance the graph walking efficiency of the present invention. Thus, binding of graph observers with note pattern/node observer pairings as found in the present invention is not equivalent to the rearranging of existing data into trees and subtrees as found in Sayah. Applicants assert that this contrast distinguishes the current invention from the prior art and places the application into condition for allowance.

With further respect to independent claim 1, Sayah does not teach or suggest a node relationship graph as included in the present invention. Sayah has an operational access facility that allows access to the initial data structure and the hierarchical tree created with the data in the initial data structure. (Col. 12, lines 2-5.) This operational access facility simply provides pointers to map the derived hierarchical tree to the underlying data structure. (Col. 12, lines 2-5.) Sayah also has a data sharing facility that provides data to the operational access facility. (Col. 12, lines 5-7.) However, as stated above, Sayah accomplishes this task by simply providing

pointers to map the data in the initial data structure with the derived hierarchical tree. Furthermore, Sayah has a model creation application that derives the hierarchical tree from the initial data structure. (Col. 12, lines 9-15.) As stated above, the derived hierarchical tree simply contains the data from the initial data structure that has been rearranged in hierarchical tree format. In contrast, the present invention includes "...a node relationship graph (NRG), wherein each node in the NRG corresponds to at least one node in the data graph, and wherein each node in the NRG includes a computed set of valid sub-node patterns." (Claim 1.) The nodes in the NRG as included in the present invention are not simply a redundant representation of the data graph as in Sayah, but instead include valid sub-node patterns. These sub-node patterns allow the data in the underlying data graph to be more efficiently walked. For the above reasons, the operation access facility, data sharing facility and model creation applications in Sayah are not equivalent to the node relationship graph as claimed in the present invention. Accordingly, Applicants request that the Office withdraw its rejection.

With still further respect to independent claim 1, the Office is incorrect in equating the model creation applications of Sayah with the graph walking logic as included in the present invention. As stated above, the model creation applications of Sayah derive a hierarchical graph from an underlying data structure. (Col. 12, lines 8-10 et seq.) The model creation applications of Sayah have nothing to do with walking a graph, but only with creating one. The present invention, in contrast, includes "...graph walking logic for systematically walking through nodes in the data graph and corresponding nodes in the NRG." (Claim 1.) This graph walking logic allows an existing data graph to be walked efficiently. Thus, the graph walking logic as claimed

in the present invention is not equivalent to the model creation applications of Sayah, which simply rearrange data. Accordingly, Applicants request that the Office withdraw its rejection.

With further respect to independent claim 1, Applicants submit that the Office is incorrect in its argument that Sayah teaches a pattern testing system. The Office attempts to support its argument by referencing a section in which Sayah discusses a generalized tree structure. (Col. 4, lines 40-50 et seq.) The tree in this discussion is one in which higher level nodes represent general information and nodes in each lower level represent an increasing level of detail. (Col. 4, lines 25-28.) Sayah states that in a tree with this structure, "...each level of hierarchy commonly contains all information of all lower levels." (Col. 4, lines 46-47.) This would be true just as would be the statement, for example, that a state contains all cities in that state. However, it would still be impossible to determine which city nodes were present in a database simply by looking at the parent state note in that database. Accordingly, Sayah simply gives a generalized statement about a specific type of graph. In contrast, the current invention has "...a pattern testing system that determines if the set of target sub-node patterns for a node pattern matches the set of valid sub-node patterns for a corresponding NRG node when a node is encountered in the data graph." (Claim 1.) This pattern testing system allows for determining if a particular sub-node is present without traversing the graph. This is clearly not anticipated by the generalized statement in Sayah referred to by the Office. Accordingly, Applicants request that the Office withdraw its rejection.

With respect to independent claims 9, 14 and 16, with the exception of those arguments made separately below, Applicants hereby incorporate the arguments enumerated above with respect to claim 1. Accordingly, Applicants request that the Office withdraw its rejection.

With respect to independent claim 14, Sayah fails to teach or suggest computing a set of target sub-node patterns for each inputted node pattern. The passage in Sayah that is cited by the Office is an overview of a computer model with several programs accessing it and an overview of a hierarchical database with a fixed number of child nodes (e.g., 4) per parent node. (Col 4, lines 4-50.) In contrast, the current invention includes "...computing a set of target sub-node patterns for each inputted node pattern." (Claim 14.) The system is not simply a general computer system or a standard hierarchical database with a fixed number of child nodes per parent as suggested by Sayah. The current invention instead generates target sub-node patterns. The sub-node patterns as included in the present invention enhance the graph walking efficiency of the present invention. Thus, computing a set of sub-node patterns as found in the present invention is not equivalent to the general computer system or the standard hierarchical database as found in Sayah. Applicants assert that this contrast distinguishes the current invention from the prior art and places the application into condition for allowance.

With further respect to independent claim 14, Sayah does not teach or suggest computing a set of valid sub-node patterns for each node in the NRG. The passage in Sayah cited by the Office simply states that a higher-level node, or "symbolic layer," may provide access through relationships to all of the entities in the data structure. (Col. 6, lines 60-63.) This statement does not refer to a directed graph, but rather to a specially created underlying data structure. (Col. 6, lines 46-47.) As stated above, this data structure is especially adapted for representing an underlying physical design, such as an integrated circuit or a map, where each unit has an area. (Col. 5, lines 8-12.) The statement cited by the Office is akin to the statement that from the city of Washington, D.C., one can get to any other city in the United States through interconnecting

roadways. While this statement may be true, neither the statement nor the cited passage in Sayah provides an efficient way to navigate these relationships. In contrast, the present invention includes "...computing a set of valid sub-node patterns for each node in the NRG." (Claim 14.) The sub-node patterns in the NRG as included in the present invention are not simply a statement of relatedness of a special data structure as in Sayah. These sub-node patterns allow the data in the underlying data graph to be more efficiently walked. For the above reasons, the navigation of symbolic layers in Sayah is not equivalent to computing a set of valid sub-node patterns as provided in the present invention. Accordingly, Applicants request that the Office withdraw its rejection.

With further respect to independent claim 14, Sayah does not teach or suggest deactivating an identified graph observer. Sayah provides a scoping facility and an encapsulation facility for use with its symbolic layers. (Col. 11, lines 55-60.) The scoping and encapsulation facilities allow Sayah to determine which end user receives access to each detail level of information. (Col. 7, lines 29-34.) These Sayah facilities do not facilitate more efficient searching of all of the data, but rather provide a "firewall" to determine who has access to what data. (Col. 7, lines 29-34.) In contrast, the present invention includes "...deactivating an identified graph observer for sub-nodes of an encountered node if none of the target sub-node patterns associated with node patterns bound to the identified graph observer match valid sub-node patterns." (Claim 14.) This deactivating of a graph observer if a match is not made facilitates more efficient searching of the entire tree by eliminating those branches that have no matching data. This deactivating does not hide detail levels of data from the user as in Sayah, but rather saves time during graph walking by deactivating links to branches of the graph that are

not part of the search pattern. Thus, the Sayah scoping and encapsulation facilities are not equivalent to deactivating of a graph observer as included in the present invention. Accordingly, Applicants respectfully request that the Office withdraw its rejection.

With further respect to claim 1, 9, 14 and 16, the Office is mistaken in equating the database locking system in Goldstein with the graph walking as included in the present invention. The system in Goldstein locks a record or series of records in a database that is being changed so that another process cannot access it. (Col. 2, lines 1-6.) In contrast, the present invention includes graph walking. The Goldstein system uses a list to record the records that are currently locked out. (Col. 2, lines 12-16.) Goldstein does not disclose an efficient way to traverse a graph. Conversely, graph walking as included in the present invention is an efficient way of traversing a graph. Therefore, the locking of database records for change in Goldstein is not equivalent to graph walking as found in the present invention.

Applicants submit that the dependent claims are allowable for the reasons stated above, as well as for their own additional features.

VI. CONCLUSION

In light of the above, Applicants respectfully submit that all claims are in condition for allowance. Should the Examiner require anything further to place the application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the number listed below.

Respectfully submitted,

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Date: 7/27/04

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